

REMARKS

Applicants thank the Examiner for the very thorough consideration given to the present Office Action.

Claims 12-48 are now pending in this application. Claims 12, 29, 37 and 44 are independent. Claims 1-11 have been canceled. Claims 12-48 have been added.

Reconsideration of this application, as amended, is respectfully requested.

OBJECTION TO SPECIFICATION

The Examiner has objected to the specification for several informalities. Applicants have thoroughly reviewed the specification and made several amendments to correct minor informalities. Accordingly, reconsideration and withdrawal of this objection are respectfully requested.

CLAIM OBJECTIONS

Claims 4 and 6 were objected to because of grammatical informalities. Claims 4 and 6 have been canceled. Accordingly, reconsideration and withdrawal of this objection are respectfully requested.

REJECTION UNDER 35 U.S.C. § 112

Claims 3, 6 and 7 stand rejected under 35 U.S.C. § 112, first paragraph. This rejection is respectfully traversed.

The Examiner takes issue with the recitation of ".3mm-3mm" in claim 3. The Examiner notes that the specification states ".3mm-1mm." Claim 3 has been canceled. Added claims 12-28 find antecedent basis in the specification. Namely, claims 23-24 recite "0.3 to 1mm."

Further, the Examiner takes issue with the recitation in claim 6 describing the position of a sensor for sensing a rotational position of the rotor. The description of the position of the sensor has been significantly revised in Applicants' presently pending claims. For example, in claim 25, it is recited that the sensor is located approximately 10-20° from one of said first and second gaps. The first and second gaps are indicated by reference numerals 33d and 36e in Fig. 10. Moreover, it is proposed to amend Fig. 10 to indicate the sensor receiving part 59, consistent with Figs. 12 and 13. In this regard, the Examiner is respectfully requested to approve the red-link changes to Fig. 10 submitted in a separate Letter to the Official Draftsperson.

Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

REJECTIONS UNDER 35 U.S.C. § 102 and § 103

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Hayashi. Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Hayashi. Claims 4 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hayashi in view of Kawaki et al. Claims 8-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hayashi in view of Erdman et al. Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hayashi in view of Kawaki et al. and further in view of Erdman et al. These rejections are respectfully traversed.

Added Claim 12

Hayashi shows a miniature generator. The Miniature generator includes a first stator core 15 having a first semicircular inner profile 15a. Further, the generator includes a second stator core 16 having a second semicircular inner profile 16a. The two inner profiles

face each other and are spaced apart by first and second gaps, a and b.

As illustrated in Fig. 4, the outer profile of the first stator core 15 "declines" as it approaches a first end of the first stator core adjacent to the first gap a. In other words, the outer profile of the first stator core 15 moves radially inward toward the rotational shaft 12.

Likewise, the outer profile of the second stator core 16 also declines toward the shaft 12, as the outer profile approaches the first end adjacent to the gap a.

Applicants' independent claim 12 recites a combination of structural elements "wherein an outer profile of said first stator core protrudes outwardly away from said rotational shaft as said outer profile progresses toward said first end of said first stator." It is respectfully submitted that Hayashi fails to show or suggest such an arrangement.

The Examiner has cited the Kawaki et al. patent as a teaching reference. The Examiner asserts that Kawaki et al. teach a motor structure wherein outer surfaces of the first stator core protrude outwardly in a radial direction away from the rotor, adjacent a gap between the first

stator core and the second stator core. Applicants respectfully disagree.

A review of Figs. 1-6 illustrates that the ends of the first and second stator cores "decline" toward the shaft of the rotor. This is directly opposite to the presently claimed combination, wherein the outer profile protrudes outwardly away from the shaft of the rotor, as the profile progresses toward the end of a stator core. Therefore, Kawaki et al. does not cure the deficiency of the primary reference. Rather, Kawaki et al. illustrates a similar arrangement to the Hayashi generator, in this regard.

As detailed in the Applicants' specification, protruding the outer profile of the stator core outwardly away from the rotational shaft of the rotor increases the output of the motor without greatly increasing the size of the overall motor. The prior art of record does not show or suggest such a combination of structural features.

The dependent claims 13-28 set forth additional distinguishing features of the present invention. For example, claims 15-17 relate to detent parts. As recited in claim 15, a first detent part is formed adjacent to the first end of the first stator core. This would also be adjacent to the first gap.

None of the prior art of record shows or suggests such an arrangement for the detent parts. For example, Figs. 1-6 of Kawaki et al. illustrate the detent parts being located in the middle of the first and second stator cores. The detent parts are certainly not located adjacent to the ends of the stator cores, which would be adjacent to the first gap 9 and the second gap 10.

Added Claim 29

Claim 29 recites a combination of structural features, "wherein one end of the first rotor receiving part near the first gap and an opposite end of the second rotor receiving part near the second gap are positioned on a vertical center line of the first and second stator cores and rotational shaft." For purposes of illustration, not limitation, the Examiner's attention is directed to Fig. 10, which illustrates the vertical center line Lv and the offset alignment of the first and second gaps, one gap being on one side of the line Lv and the other gap being on the other side of the line Lv.

As detailed in Applicants' specification, the claimed arrangement enhances the drivability, particularly the initial or starting drivability, of the rotor. On the

contrary, Hayashi (US 4,777,394), Kawaki et al. (US 4,162,418) and Erdman et al. (US 6,271,638) fail to show or suggest the combination of claim 29. Hence, the prior art of record does not offer the enhanced drivability of the present invention.

Added Claim 37

Claim 37 recites a combination of structural features including "a pair of separation members for electromagnetically separating the respective shaft support parts from respective ends of the stator cores, said separation members being inserted between the stator cores and respective ones of the shaft support parts and receiving a part of the rotor protruded from the stator cores." An advantage of the separation members is that they prevent eddy current losses between the rotor and the stator cores. Therefore, the combination of added claim 37 increases the performance of the motor.

The prior art of record fails to show or suggest a combination, as recited in added claim 37. For example, in Erdman et al., end shields 510, 512 (regarded by the

Examiner as the corresponding separation members of the claimed invention) do not receive a part of the rotor protruded from the stator cores. The end shields 510, 512 support bearings 509, 504 and oil well covers 516, 518. Hence, the end shields 510, 512 differ from the separation members of the claimed invention, which electromagnetically separate the shaft support parts from the stator cores.

Added Claim 44

Claim 44 recites a combination of structural features including "a sensor for sensing a rotational position of the rotor, said sensor being positioned around 10-20° from the symmetry line nearer to the coil winding unit in an opposite rotational direction of the rotor."

For purposes of illustration, not limitation, the advantages of the claimed positioning of the sensor are explained in Applicants' specification. Particularly, the sensor detects the position of the rotor's magnetic pole in advance, considering that the electric power which is applied to the coil is delayed. Therefore, a magnetic flux is generated corresponding to the rotation of the rotor, and thereby the efficiency of the rotor can be improved as

described at page 14, lines 13-17, in Applicants' Specification.

The prior art of record fails to show or suggest such a combination. The Examiner relies on Erdman et al. as a teaching reference for a position sensor. According to Erdman et al., the core 360 does not have gaps as in the claimed invention. In addition, the sensor 439 can be seen to be positioned on the center line of the stator. See Figs. 9, 11.

For the reasons stated above, reconsideration and withdrawal of these rejections are respectfully requested.

Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.

Applicants respectfully petition under the provisions of 37 C.F.R. § 1.136(a) and 1.17 for a one month extension

of time in which to respond to the Examiner's Office Action. The Extension of Time Fee in the amount of \$110.00 attached hereto.

If the Examiner believes, for any reasons, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone Mr. Scott L. Lowe (Reg. No. 41,458) at (703) 205-8000 in the Washington, D.C. area.

Prompt and favorable consideration of this Amendment is respectfully requested.

Appln. No. 10/041,613P
Atty. Docket No. 0630-1403P

If necessary, the Commissioner is hereby authorized in this, concurrent, and further replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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JTE/SLL/mmi

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

The paragraph beginning on Page 8, line 10, has been amended as follows:

-- A pair of rotational shaft [supporting units] support parts 14 and 21 including bearings 16 and 22 for rotatably supporting the rotational shaft 13 are connected on both sides of the stator 31 in a direction of the rotational shaft 13.--

The paragraph beginning on Page 8, line 17, has been amended as follows:

-- A pair of screw boss parts 18 and 23 which are protruded so as to [be inserted into]overlap a through hole [19]37 formed on the stator 31 are formed on boundary portion of the shaft support parts 14 and 21. A though hole 19 through which a screw 20 for combining the stator 31 with the shaft support parts 14 and 21 can be passed is formed at a center of the respective screw boss parts 18 and 23. And female screw parts 25 are formed on a boundary portion of the screw boss parts 18 and 23 in pair.--

The paragraph beginning on Page 9, line 2, has been amended as follows:

--In addition, as shown in Figures 7 and 8, a first separation member 26 and a second separation member 29 are respectively inserted between the [rotor receiving]shaft support parts 14 and 21 and the stator 31 so as to prevent impurities from approaching from outer circumference.--

The paragraph beginning on Page 9, line 23, has been amended as follows:

--The first stator core 32 comprises a first rotor receiving part 33a of semicircular shape which is disposed on boundary of the rotor 11 with the separate spaces 33d and 36[d]e, and a first extended part 33b which is extended to one direction (downward in Figure 10) of the rotor receiving part 33a.--

The paragraph beginning on Page 11, line 4, has been amended as follows:

--As shown in Figure 10, the separate spaces are divided into a first separate space 33d formed on an upper part of the first and second rotor receiving parts 33a and 36[e]a, and a second separate space 36e formed on a lower

part of the first and second rotor receiving parts 33a and
36[e]a.--

The paragraph beginning on Page 11, line 8, has been amended as follows:

--Herein, the first separate space 33[a]d and the second separate space 36e are formed to face each other centering around the rotational shaft of the rotor 11, and it is desirable that the width of the separate space is 0.3mm through 1mm.--

The paragraph beginning on Page 11, line 11, has been amended as follows:

--In addition, a pair of detent parts 33e and 36f having larger radius than the radius from the rotational shaft 13 to the first and second rotor receiving parts 33a and 36[e]a are formed on the first and second rotor receiving parts 33a and 36a in rotating direction of the rotor 11.-

The paragraph beginning on Page 11, line 15, has been amended as follows:

--As shown in Figure 10, the first detent part 33e and the second detent part 36f are formed respectively on the rotor receiving part 33a and on the second rotor receiving part 36a to the rotating direction of the rotor 11 around $10[~]-20^\circ(\theta)$ from a center line in length direction, and make a point symmetry centering around the rotational shaft 13.--

The paragraph beginning on Page 11, line 25, has been amended as follows:

--Figures 12 and 13 are a side view and a plan view showing a PCB cover 57 as shown in Figure 7, and Figure 14 is a block diagram showing a circuit structure of the PCB 51 shown in Figure 7.--

The paragraph beginning on Page 12, line 18, has been amended as follows:

--The sensor receiving part 59 is installed around $10[~]-20^\circ$ from the Lv in an opposite rotational direction of the rotor 11 so as to sense a stimulus of the rotor 11 in advance, considering that the current which is actually applied is delayed to approach to a peak value by an inductance when the current is supplied to the coil. In the

Appln. No. 10/041,613P
Atty. Docket No. 0630-1403P

present embodiment, the sensor receiving part 59 is installed about 13.5° position from the center line Lv.--

IN THE CLAIMS

Claims 1-11 have been canceled.

New claims 12-48 have been added.